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MAG
SURVEY



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INDEX

Introduction	Page 1
Property	1
Location and Accessibility	2
Topography	2
Previous Work	2, 3
Line Cutting	3, 4
General Geology	4, 5
Magnetometer Survey	5, 6
Interpretation	6, 7, 8, 9
Conclusions and Recommendations	9.

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Geo-Magnetic Contour Plan

- Scale 1" = 200 feet

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REPORT ON MAGNETOMETER SURVEY - LIGHTNING MOUNTAIN
GROUP OF CLAIMS - FRECHEVILLE AND LAMPLUGH TOWNSHIPS,
LARDER LAKE MINING DIVISION, PROVINCE OF ONTARIO,

Introduction:

The following report describes the magnetometer survey recently completed on the Canadian Johns-Manville Company Limited claims located in Frecheville and Lamplugh Townships, Larder Lake Mining Division, Province of Ontario.

Cutting of picket lines on this claims group was contracted to Jean Alix Company Limited of Val d'Or, Quebec. Picket lines were cut at right angles to a base line trending N66°W in Frecheville Township and S80°W in Lamplugh Township and were established at 200 foot intervals. Pickets were fixed at 50 foot spacing along these offset lines by chaining.

Magnetometer surveying was conducted by R. Kaltwasser, senior fieldman with Canadian Johns-Manville Company Limited. R. Haley assisted throughout the survey. Readings were recorded at 25' or 50 foot intervals along the offset lines using a Sharpe's A-2 type instrument - spacing was dependent upon the amount of detail required.

Supervision and interpretation of this work was the responsibility of the writer, senior geologist with Canadian Johns-Manville Company Limited.

Property:

The claims surveyed are located in the southwestern and southeastern parts of Frecheville and Lamplugh Townships, respectively, in the Larder Lake Mining Division and are numbered as follows: -

- Group No. 1 - L-70982 - 83 - 84 - 85 - 90 - 91 - 93 - 94 - 95 - 96 - 97 - 99
and 71000 - 13 claims
Group No. 2 - L-71840 - 41 - 42 - 43 - 46 - 5 claims

Note that all claims are located in Frecheville Township with the exception of L-71843 and L-71846 which are located in Lamplugh Township.

These eighteen claims comprise approximately 720 acres.

Location and Accessibility:

The property is located in the southwestern and southeastern section of Frecheville and Lamplugh Townships, respectively, in the Larder Lake Mining Division, approximately thirty-eight miles east of the Town of Matheson and two and one-half miles north of Highway No. 101 (Matheson - Duparquet). This highway has now been paved to within fourteen miles of the Harker - Holloway Townships boundary and provides ready access to this point. A tractor road has been bulldozed from the highway, north through the Teddy Bear Gold Mines Property to the claims group. This road is suitable for travel by four-wheeled drive vehicles under winter conditions.

Topography:

The southwestern part of Frecheville Township and the southeastern part of Lamplugh Township lie over one of the Ghost Range hills, which rises several hundred feet above the surrounding region and covers an area of about one square mile. This hill has a very irregular surface with steep slopes which give it a local relief of approximately fifty feet. The north side is relatively steep and is likely a talus slope that is covered by overburden. Farther to the north the terrain is relatively flat and the bedrock is covered with clay. Note that Lightning Mountain, another of the Ghost Range hills, is situated in the extreme eastern section of the claims group.

The surface of the hill is sparsely timbered with spruce while the relatively flat area to the north is overgrown with poplar, alders, moose maple, willow and scattered spruce.

Drainage is supplied by the Lightning River which flows through the claims group and empties into Abitibi Lake, to the north.

Previous Works:

Reconnaissance, geological mapping was carried out in this area in

1918 by C. W. Knight and the results of his work are shown in Ontario Department of Mines, Volume XXVII, Part II, 1919 - Abitibi - Night Hawk Gold Area.

J. Satterly mapped the north half of Holloway Township for the Ontario Department of Mines and on the published map (No. 1953 - 4) he has shown the geology of part of the southeastern section of Frecheville Township.

During 1949 and 1950, Dominion Gulf Company conducted a magnetometer survey and bored three diamond drill holes on the extreme eastern portion (south and east of the Lightning River) of the present Canadian Johns-Manville Limited claims. This work indicated the continuation of the ultrabasic zone along the north limb of the Lightning Mountain syncline.

The claims of Group No. 1 were staked during the period June 11th - 15th inclusive, 1959 by R. Kaltwasser and H. McDougall and were recorded on June 26th, 1959. The claims of Group No. 2 were staked on January 12th and 13th, 1960 by W. Petruk and were recorded on January 27th, 1960. All claims have now been transferred to Canadian Johns-Manville Company Limited.

During the early part of May, 1960, geologic and dip needle traverses were carried out on the claims group by Dr. W. Petruk, geologist for this Company and L. Allison, fieldman. These traverses were spaced at 400 foot intervals and the results outlined the west extension of the sill-like body of ultrabasic rocks that were mapped and drilled by Dominion Gulf Company.

Line Cutting:

During the early part of August 1960, a base line trending N66°W was turned off from the two mile post on the Frecheville - Holloway Townships boundary, using a transit. This base line was out and surveyed for a length of 5,600 feet by "Company" personnel. The remainder of the line cutting and chaining was contracted to Jean Alix Company Limited of Val d'Or, Quebec and the work was carried out during the period September 18th to October 13th, 1960, inclusive.

The base line was cut to the west for a total length of 11,400 feet from the two mile post. At this point the strike was changed to $S80^{\circ}W$ and the base line was continued into Lamplugh Township for an additional length of 2,400 feet.

Right-angled offset lines were established at 200 foot intervals along the base line and lines were cut both north and south, as required. (Note that every second line was extended to the claim boundaries while in between lines were cut only far enough on either side of the base line to straddle the ultrabasic zone). Pickets with numbered locations were fixed at fifty foot intervals along these offset lines by chainage.

A total of 22.3 miles of picket lines and base line was out and chained during the course of this program.

General Geology:

During May of 1960 reconnaissance traverses spaced at approximately 400 foot intervals, were conducted over the claims group by Dr. W. Petruk, geologist with Canadian Johns-Manville Company, Limited. L. Allison assisted during the course of this work. Although no geologic plan is attached to this report the results of Dr. Petruk's work are discussed below.

The general area is underlain by an assemblage of basic to acid volcanic rocks with interbedded sedimentary formations. These are intruded by the Ghost Range basic to ultrabasic complex which form an east-west row of hills across Frecheville, Lamplugh, Harker and Holloway Townships. The main part of the area under consideration is underlain by the Ghost Range intrusives while the north side of the claim group is underlain by the volcanic assemblage.

The rock outcropping on the central part of the hill in Frecheville Township (in close proximity to the Lamplugh Township boundary) is a greyish-black, fine grained dolerite, mottled with about 20 - 30% feldspar and 2 - 5% pyrite and pyrrhotite. Hornblende comprises most of the remainder of the rock.

General Geology: (cont'd)

This dolerite grades into a medium grained, grey gabbro within about 1,000 feet of the basic-ultrabasic contact. The gabbro is composed of pyroxene and basic feldspar and has the typical diabasic texture of the Ghost Range enstatite diabase.

A band of pyroxenite occurs north of the gabbro and outcrops in Lamplugh Township about 3,000 feet west of the Frecheville-Lamplugh Townships boundary and outcrops again in Frecheville Township about 5,500 feet east of the same boundary line and 1,700 feet north of the Frecheville-Holloway Townships boundary. The contact between the gabbro and pyroxenite (observed in Lamplugh Township) strikes $N75^{\circ}E$ and dips 65° South. The pyroxenite is a fine to medium grained, reddish-brown weathering, greenish-black rock and is composed of highly serpentinized and moderately carbonated pyroxene crystals and minor amounts of olivine.

The main part of the serpentinized peridotite zone does not outcrop but a brown weathering, carbonated and serpentinized peridotite was mapped near the pyroxenite exposures in Lamplugh Township.

Three north-south faults, in Lamplugh Township, have been interpreted from a left hand displacement of the dip needle anomaly, and the fault traces coincide with stream or topographic breaks.

Magnetometer Survey:

A magnetometer survey was conducted over the Lightning Mountain Group of claims by R. Kaltwasser with the assistance of R. Haley, during the period December 6th, 1960 to January 20th, 1961. Magnetic readings were recorded using a Sharpe's A-2 type instrument (C.J.M. No. 166) having a sensitivity or scale constant of 20.00 gammas per scale division. Note that this instrument was calibrated before commencement of the survey.

Magnetometer Survey: (cont'd)

The value of Base Control Station No. 1, located at 7400 South of picket line 16400 West was corrected to Munro Mine Base Stations No. 2 (Munro - Beatty Sill) and was given a fixed value of 3560 gammas. Consequently with this correction, a gamma value of 1220 corresponds to an absolute value of 57,599 \pm 15 gammas as established at the Government Magnetic Base Station located at Matheson, Ontario. Base Control Station No. 2, located at 3400 South on picket line 62400 West and having a corrected value of 3554 gammas and Base Control Station No. 3, located on the base line at picket line 128400 West and having a corrected value of 670 gammas, were both tied in to Base Control Station No. 1.

During the course of the survey, the appropriate base control station was observed at regular intervals (four observations per day) as a check on the working condition of the instrument and to record the daily diurnal variation. Stations were spaced at 250 or 50 foot intervals along the picket lines, depending upon the magnetic intensity of the underlying formations.

A total of 2854 stations was recorded on the Lightning Mountain Group of claims during the course of the magnetometer survey.

The results of the magnetometer survey are depicted on the accompanying plan on a scale of one inch equals 200 feet. Contour lines of equal magnetic intensity have been drawn at 500 gamma intervals from 0 to 6000. The interval has been changed to 1000 gammas for readings between 6000 and 15,000 gammas.

Interpretation:

The interpretation has been based upon a study of the geomagnet:

plan, previous work in the area (diamond drilling, geophysical and geological surveys), regional geology and aerial data.

Magnetic results indicate the occurrence of a large sill-like band of ultrabasic rocks striking across the claims group. The intrusive trends approximately by $N66^{\circ}W$ in Frecheville Township but due to faulting and/or folding this strike is altered to east-west in Lamplugh Township. To the east of the Lightning River fault zone the ultrabasic dips steeply to the south - this is indicated by the magnetic data and also by drill hole information by Dominion Gulf Company. On the west side of the fault zone the dip appears to steepen to vertical or near vertical and on the basis of the magnetic results alone the dip in some of the fault blocks may be steeply to the north. However, geological mapping indicates a steep south dip in Lamplugh Township and consequently the magnetic effect may be due to a concentration of magnetite along the south side of the sill. Widths vary from 650 feet in the eastern section of the map area, to 100 feet in the extreme western section.

Readings over the ultrabasic range in value from 3,000 to slightly over 25,000 gammas. This variation in the magnetic intensity over the ultrabasic is due to a series of factors. Concentrations of magnetite, both as disseminations and as seams, in certain zones within the ultrabasic sill cause wide variations in the readings. Alteration, mainly talc-carbonate, greatly reduces the magnetic susceptibility and complicates the distinction between altered serpentized peridotite and the surrounding rocks (i.e. gabbro, dioritic volcanics, sediments, etc.). Depth of overburden has an appreciable effect - depths of 60 to 100 feet may effectively mask a weakly to moderately magnetic ultrabasic zone. In this regard, detailed topography is of major importance in interpreting magnetic data. Structure also plays a large part. Dip changes in different fault blocks are difficult to perceive without a certain

amount of surface mapping and/or diamond drilling.

Due to the lack of rock exposures it has been impossible to obtain information about the ultrabasic contacts by geological mapping. However, on the basis of the magnetic survey there appears to be a strong concentration of magnetite within the serpentinized peridotite and this concentration occurs fairly consistently in close proximity to the south contact. Another factor contributing to this marked zone of "highs" is the relatively shallow overburden on the northslope of the hills. The north contact (ultrabasic-volcanic-sedimentary assemblage) is masked by deep overburden, 50 to 125 feet and this factor combined with the south dip of the sill, accounts for the relatively lower readings.

The magnetic intensities over the gabbro vary from 7000 gammas at the ultrabasic contact to 1100 gammas several hundred feet south of same. Magnetic intensities over the volcanic-sedimentary assemblage vary from 3000 gammas at the ultrabasic contact to 500 gammas several hundred feet north of same. On the basis of the magnetic results it is impossible to differentiate between the acid volcanics (rhyolite), the intermediate volcanics (andesite) and the sedimentary formations (arkose, greywacke and conglomerate). All of the above mentioned rock types have been intersected in diamond drill holes along the north contact of the ultrabasic sill.

A band of rhyolite has been mapped by J. Satterly for the Ontario Department of Mines and is shown on the accompanying plan in the extreme southwest corner of claim L-70990. The magnetic intensity over this rhyolite varied from 1090 to 1370 gammas.

The ultrabasic zone delineated on the accompanying plan is part of the north limb of the Ghost Range Syncline. (Same is described by J. Satterly in his reports on Harker and Holloway Townships.) This complex is highly faulted and folded throughout. Approximately fifteen strong cross structures

have been outlined on the accompanying plan on the basis of magnetic, topographic and regional geologic data. In the eastern portion of the claims group the Lightning River fault zone causes a 700 foot displacement of the ultrabasic zone (west side having moved north.) This major, regional fault zone strikes approximately north-south. Several cross structures in the eastern portion of the map area parallel the Lightning River fault. Further to the west two major fault patterns have been delineated - one trending slightly to moderately east of north, the other trending slightly west of north. Displacements along these fault zones range from 25 to 125 feet. In Lamplugh Township the magnetic results indicate intense folding of the ultrabasic sill and some of the faults shown on the accompanying plan for this area may represent strong folds.

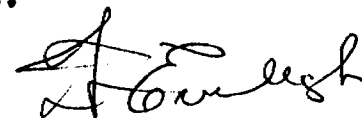
Longitudinal faulting is extremely difficult to delineate on the basis of magnetic data alone. However, on the basis of the limited diamond drilling completed to date shearing does occur along both the north and south contacts of the ultrabasic in some of the fault blocks. Parallel structures may occur within the ultrabasic sill.

CONCLUSIONS AND RECOMMENDATIONS:

Magnetic surveying of the Lightning Mountain Group of claims has delineated a sizeable sill of highly faulted and folded ultrabasic rocks.

Due to the occurrence of several extremely interesting zones of "Highs" along the southern margin of the intrusive and to the high degree of faulting and folding, a program of diamond drilling is definitely warranted as the next phase of this exploration program. This program should be followed by detailed geological mapping immediately after the break-up period.

January 23rd, 1961.



F. J. Eveleigh.

